



16040 - Constraining the coma volatile content of interstellar comet 2I/Borisov

Cycle: 27, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) 2IV4	WFC3/UVIS	1	04-Mar-2020 11:00:38.0	yes
1A	(1) 2IV4	WFC3/UVIS	1	04-Mar-2020 11:00:39.0	yes
02	(2) 2IV5	WFC3/UVIS	2	04-Mar-2020 11:00:40.0	yes
03	(3) 2IV6	WFC3/UVIS	2	04-Mar-2020 11:00:41.0	yes

6 Total Orbits Used

ABSTRACT

We request 6 orbits of observing time to observe the recently discovered interstellar comet 2I/Borisov using WFC3/UVIS. The goal of this program is to better understand the interstellar object population and its member's volatile contents. We will use these observations to characterize 2I's comacentric color morphology and evolution over three separate observing epochs at varying heliocentric distances during its passage through the Solar System.

OBSERVING DESCRIPTION

We request a total of one visit consisting of two orbits to constrain the size and characterize the coma of C/2019 Q4 with WFC3/UVIS. We will acquire images in two medium band and one narrow-band filter (F689M and F845M, and 487N) to image the distribution of dust and ice in the coma. The medium filters are relatively free of gas emission features, and the narrow-band filter 487N is very similar to a comet-specific dust color filter in the International Halley Watch filter set (Farnham et al. 2000). We note that while this filter is designed to observe HBeta filter, the emission of H atoms around comets is diffuse and extended past 10^6 km, well beyond the size physical size of our aperture at the geocentric distance of the comet at the proposed time of observations (~ 400 km at ~ 3 au for a 0.2" aperture). The combination of these three filters allows us to use the dust color between 487 -- 845 nm to compare the gas and ice fraction, dust composition, and particle size in the ambient coma.

We request coordination of observations with GO Proposal 16041 (PI D. Jewitt) so that our observations are scheduled within ~ 1 -2 days of the GO Proposal 16041 to maximize the usefulness of these datasets.

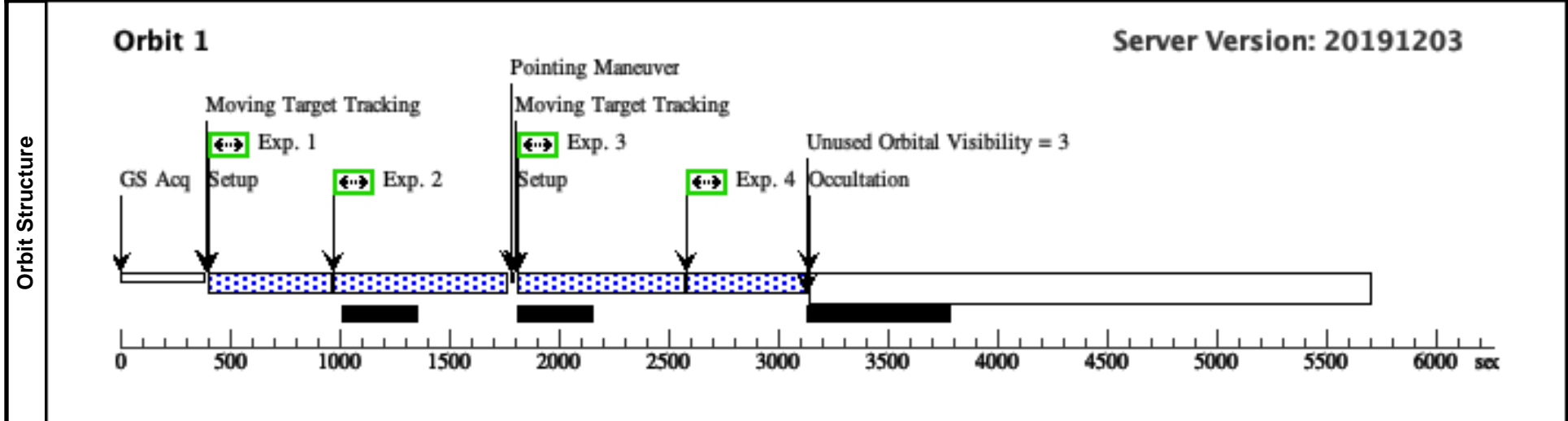
Proposal 16040 - Visit 01 - Constraining the coma volatile content of interstellar comet 2I/Borisov

Wed Mar 04 16:00:42 GMT 2020

Visit	Proposal 16040, Visit 01, completed					
	Diagnostic Status: No Diagnostics					
	Scientific Instruments: WFC3/UVIS					
	Special Requirements: ORIENT 292D TO 292 D; BETWEEN 07-DEC-2019:00:00:00 AND 10-DEC-2019:00:00:00					
<i>Comments: This visit is to occur around the time of perihelion passage between Dec 7 and 10</i>						

Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
	(1)	2IV4	TYPE=COMET,Q=2.0067655318826 27,E=3.357515577983859,I=44.04995 363419669 .O=308.1494805144747,W=209.11766 13137146,T=08-DEC- 2019:13:04:53,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=15-OCT- 2019:00:00:00,EpochTimeScale=TDB, A1=-6.92301940918E- 8,A2=5.176229858398E- 7,A3=6.539577007294E-8				
<i>Comments: Description=2I_Borisov Extended=YES</i>							

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) 2IV4	(1) 2IV4	WFC3/UVIS, ACCUM, UVIS2	F689M	FLASH=9	POS TARG 0.099,0.106			405 Secs (404 Secs) [=>404.0 Secs]
2	(1) 2IV4	(1) 2IV4	WFC3/UVIS, ACCUM, UVIS2	F487N	FLASH=11	POS TARG 0.099,0.106			640 Secs (639 Secs) [=>639.0 Secs]	[1]
3	(1) 2IV4	(1) 2IV4	WFC3/UVIS, ACCUM, UVIS2	F487N	FLASH=11	POS TARG 0.198,0.212			640 Secs (639 Secs) [=>639.0 Secs]	[1]
4	(1) 2IV4	(1) 2IV4	WFC3/UVIS, ACCUM, UVIS2	F845M	FLASH=10	POS TARG 0.198,0.212			405 Secs (404 Secs) [=>404.0 Secs]	[1]



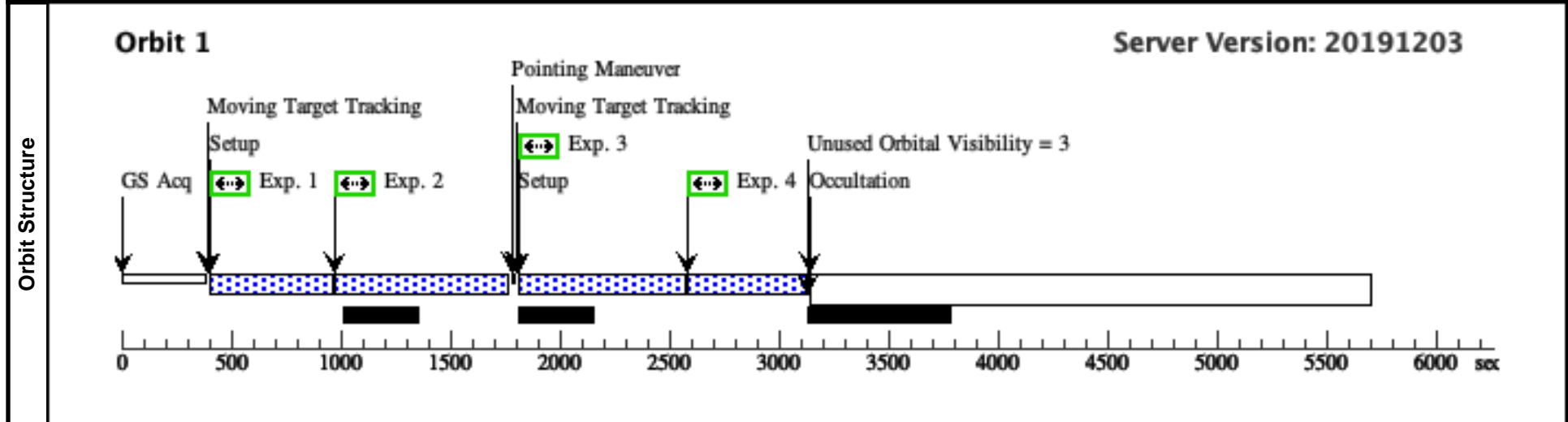
Proposal 16040 - Visit 1A - Constraining the coma volatile content of interstellar comet 2I/Borisov

Wed Mar 04 16:00:42 GMT 2020

Visit	Proposal 16040, Visit 1A, completed					
	Diagnostic Status: No Diagnostics					
	Scientific Instruments: WFC3/UVIS					
	Special Requirements: BETWEEN 07-DEC-2019:00:00:00 AND 10-DEC-2019:00:00:00; GROUP 1A,01 WITHIN 5 Orbits					
<i>Comments: This visit is to occur around the time of perihelion passage between Dec 7 and 10</i>						

Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
	(1)	2IV4	TYPE=COMET,Q=2.0067655318826 27,E=3.357515577983859,I=44.04995 363419669 .O=308.1494805144747,W=209.11766 13137146,T=08-DEC- 2019:13:04:53,TTimeScale=TDB,EQ UINOX=J2000,EPOCH=15-OCT- 2019:00:00:00,EpochTimeScale=TDB, A1=-6.92301940918E- 8,A2=5.176229858398E- 7,A3=6.539577007294E-8				
<i>Comments: Description=2I_Borisov Extended=YES</i>							

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) 2IV4	(1) 2IV4	WFC3/UVIS, ACCUM, UVIS2	F845M	FLASH=10	POS TARG 0.297,0.318		405 Secs (404 Secs) [=>404.0 Secs]	[1]
	2	(1) 2IV4	(1) 2IV4	WFC3/UVIS, ACCUM, UVIS2	F487N	FLASH=11	POS TARG 0.297,0.318		640 Secs (639 Secs) [=>639.0 Secs]	[1]
	3	(1) 2IV4	(1) 2IV4	WFC3/UVIS, ACCUM, UVIS2	F487N	FLASH=11	POS TARG 0.396,0.424		640 Secs (639 Secs) [=>639.0 Secs]	[1]
	4	(1) 2IV4	(1) 2IV4	WFC3/UVIS, ACCUM, UVIS2	F689M	FLASH=9	POS TARG 0.396,0.424		405 Secs (404 Secs) [=>404.0 Secs]	[1]



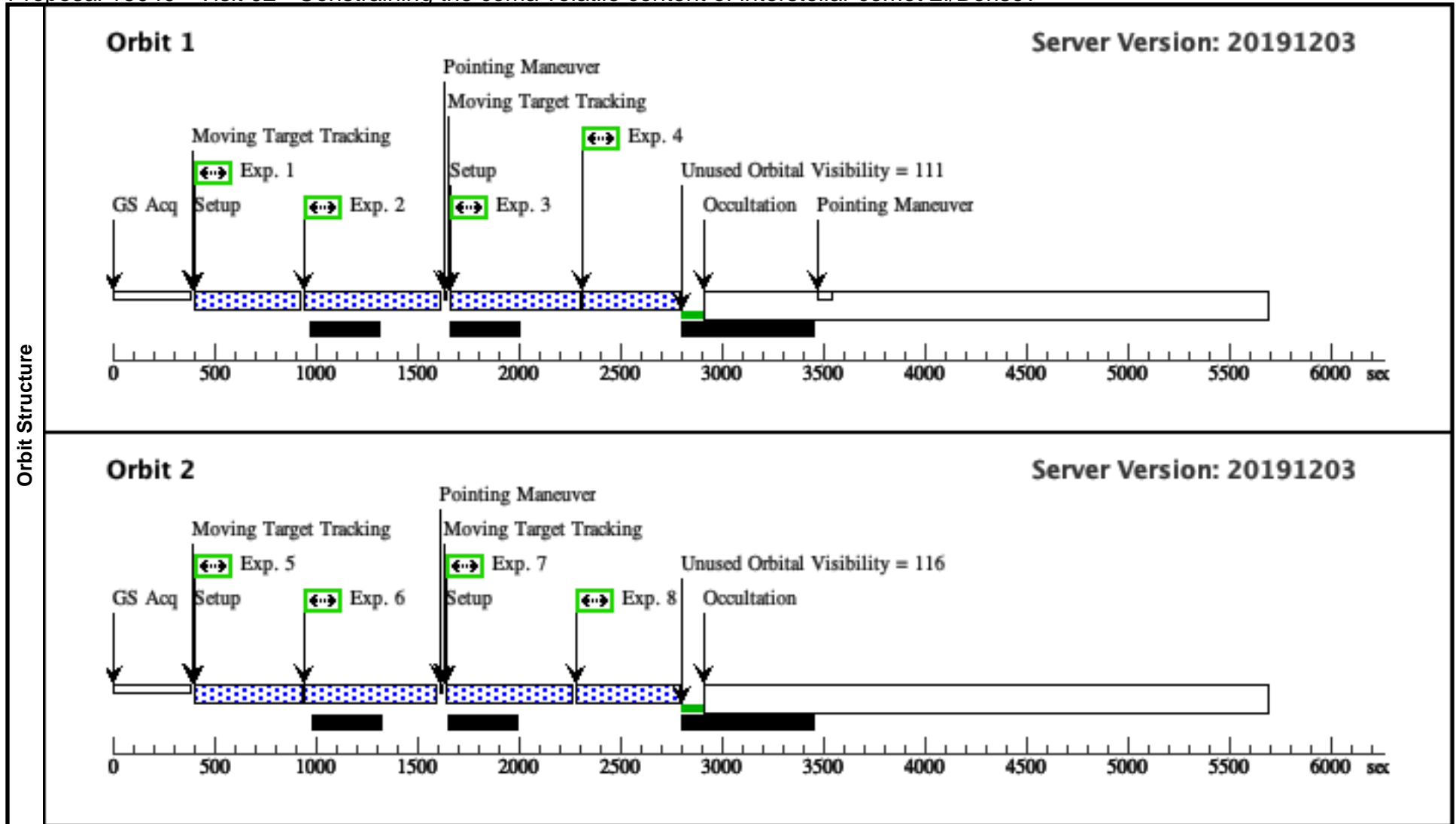
Proposal 16040 - Visit 02 - Constraining the coma volatile content of interstellar comet 2I/Borisov

Wed Mar 04 16:00:42 GMT 2020

Visit	Proposal 16040, Visit 02, completed					
	Diagnostic Status: No Diagnostics					
	Scientific Instruments: WFC3/UVIS					
	Special Requirements: SCHED 100%; ORIENT 282.5D TO 290 D; BETWEEN 27-JAN-2020:00:00:00 AND 30-JAN-2020:00:00:00					

Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
	(2)	2IV5	TYPE=COMET,Q=2.0066160399249 64,E=3.35705587897315,I=44.053519 23993201 .O=308.1499849748581,W=209.12444 71001688,T=08-DEC- 2019:13:18:19,TimeScale=TDB,EQ UINOX=J2000,EPOCH=05-JAN- 2020:00:00:00,EpochTimeScale=TDB, A1=-4.515200138092E-8,A2=- 3.231415748596E-8,A3=- 1.17710609436E-7				
<i>Comments: Description=2I_Borisov Extended=YES</i>							

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(2) 2IV5	(2) 2IV5	WFC3/UVIS, ACCUM, UVIS2	F689M	FLASH=9	POS TARG 0.099,0.106	Sequence 1-4 Non-Int in Visit 02	372 Secs (372 Secs) [==>]	[1]
2	(2) 2IV5	(2) 2IV5	WFC3/UVIS, ACCUM, UVIS2	F487N	FLASH=11	POS TARG 0.099,0.106	Sequence 1-4 Non-Int in Visit 02	520 Secs (520 Secs) [==>]	[1]	
3	(2) 2IV5	(2) 2IV5	WFC3/UVIS, ACCUM, UVIS2	F487N	FLASH=11	POS TARG 0.198,0.212	Sequence 1-4 Non-Int in Visit 02	520 Secs (520 Secs) [==>]	[1]	
4	(2) 2IV5	(2) 2IV5	WFC3/UVIS, ACCUM, UVIS2	F845M	FLASH=10	POS TARG 0.198,0.212	Sequence 1-4 Non-Int in Visit 02	342 Secs (342 Secs) [==>]	[1]	
5	(2) 2IV5	(2) 2IV5	WFC3/UVIS, ACCUM, UVIS2	F845M	FLASH=10	POS TARG 0.297,0.318; NEW OBSET FULL ACQ	Sequence 5-8 Non-Int in Visit 02	375 Secs (375 Secs) [==>]	[2]	
6	(2) 2IV5	(2) 2IV5	WFC3/UVIS, ACCUM, UVIS2	F487N	FLASH=11	POS TARG 0.297,0.318	Sequence 5-8 Non-Int in Visit 02	500 Secs (500 Secs) [==>]	[2]	
7	(2) 2IV5	(2) 2IV5	WFC3/UVIS, ACCUM, UVIS2	F487N	FLASH=11	POS TARG 0.396,0.424	Sequence 5-8 Non-Int in Visit 02	500 Secs (500 Secs) [==>]	[2]	
8	(2) 2IV5	(2) 2IV5	WFC3/UVIS, ACCUM, UVIS2	F689M	FLASH=9	POS TARG 0.396,0.424	Sequence 5-8 Non-Int in Visit 02	374 Secs (374 Secs) [==>]	[2]	



Proposal 16040 - Visit 03 - Constraining the coma volatile content of interstellar comet 2I/Borisov

Wed Mar 04 16:00:42 GMT 2020

Visit	Proposal 16040, Visit 03, implementation							Wed Mar 04 16:00:42 GMT 2020		
	Diagnostic Status: No Diagnostics									
Scientific Instruments: WFC3/UVIS										
Special Requirements: BETWEEN 23-MAR-2020:00:00:00 AND 30-MAR-2020:00:00:00										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
		(3)	2IV6	TYPE=COMET,Q=2.0066160399249 64,E=3.35705587897315,I=44.053519 23993201 .O=308.1499849748581,W=209.12444 71001688,T=08-DEC- 2019:13:18:19,TTTimeScale=TDB,EQ UINOX=J2000,EPOCH=05-JAN- 2020:00:00:00,EpochTimeScale=TDB, A1=-4.515200138092E-8,A2=- 3.231415748596E-8,A3=- 1.17710609436E-7					EARTH	
	Comments: Description=2I_Borisov Extended=YES									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(3) 2IV6	(3) 2IV6	WFC3/UVIS, ACCUM, UVIS2	F689M	FLASH=9	POS TARG 0.099,0.106	Sequence 1-5 Non-Int in Visit 03	418 Secs (386 Secs) [=>386.0 Secs]	[1]
	2	(3) 2IV6	(3) 2IV6	WFC3/UVIS, ACCUM, UVIS2	F438W	FLASH=8	POS TARG 0.099,0.106	Sequence 1-5 Non-Int in Visit 03	418 Secs (386 Secs) [=>386.0 Secs]	[1]
	3	(3) 2IV6	(3) 2IV6	WFC3/UVIS, ACCUM, UVIS2	F438W	FLASH=8	POS TARG 0.198,0.212	Sequence 1-5 Non-Int in Visit 03	418 Secs (386 Secs) [=>386.0 Secs]	[1]
	4	(3) 2IV6	(3) 2IV6	WFC3/UVIS, ACCUM, UVIS2	F689M	FLASH=9	POS TARG 0.198,0.212	Sequence 1-5 Non-Int in Visit 03	418 Secs (386 Secs) [=>386.0 Secs]	[1]
	5	(3) 2IV6	(3) 2IV6	WFC3/UVIS, ACCUM, UVIS2	F845M	FLASH=10	POS TARG 0.198,0.212	Sequence 1-5 Non-Int in Visit 03	418 Secs (386 Secs) [=>386.0 Secs]	[1]
	6	(3) 2IV6	(3) 2IV6	WFC3/UVIS, ACCUM, UVIS2	F845M	FLASH=10	POS TARG 0.297,0.318	Sequence 6-10 Non-Int in Visit 03	418 Secs (411 Secs) [=>411.0 Secs]	[2]
	7	(3) 2IV6	(3) 2IV6	WFC3/UVIS, ACCUM, UVIS2	F438W	FLASH=8	POS TARG 0.297,0.318	Sequence 6-10 Non-Int in Visit 03	418 Secs (411 Secs) [=>411.0 Secs]	[2]
	8	(3) 2IV6	(3) 2IV6	WFC3/UVIS, ACCUM, UVIS2	F438W	FLASH=8	POS TARG 0.396,0.424	Sequence 6-10 Non-Int in Visit 03	418 Secs (411 Secs) [=>411.0 Secs]	[2]
	9	(3) 2IV6	(3) 2IV6	WFC3/UVIS, ACCUM, UVIS2	F845M	FLASH=10	POS TARG 0.396,0.424	Sequence 6-10 Non-Int in Visit 03	418 Secs (411 Secs) [=>411.0 Secs]	[2]
	10	(3) 2IV6	(3) 2IV6	WFC3/UVIS, ACCUM, UVIS2	F689M	FLASH=9	POS TARG 0.396,0.424	Sequence 6-10 Non-Int in Visit 03	418 Secs (411 Secs) [=>411.0 Secs]	[2]

